



299-E28-56 (A6807)

Log Data Report

Borehole Information:

Borehole: 299-E28-56 (A6807)		Site: 216-B-9 Crib			
Coordinates (WA State Plane)		GWL (ft)¹: Not reached		GWL Date: N/A ²	
North	East	Drill Date	TOC³ Elevation	Total Depth (ft)	Type
136,851.6 m	573,861.5 m	July 1948	208.4 m	150	Cable Tool

Casing Information:

Casing Type	Stickup (ft)	Outer Diameter (in.)	Inside Diameter (in.)	Thickness (in.)	Top (ft)	Bottom (ft)
Steel Welded	2.0	8.625	8.0	0.3125	0	152

Borehole Notes:

The logging engineer measured the stickup using a steel tape. Stickup was measured between an engraved "X" on top of the casing and the ground surface. Calipers were used to measure the casing wall thickness and the outside diameter; the inside diameter is calculated. Zero reference is the top of casing stickup, and top of casing stickup is cut squarely. HWIS⁴ is the source of the TOC elevation and coordinates. Total depth (ground level reference) and casing bottom (TOC reference) are reported from information provided in Chamness and Merz (1993). The borehole was swabbed 03/12/02, and no contamination was detected.

Logging Equipment Information:

Logging System:	Gamma 2B	Type:	SGLS (35%)
Calibration Date:	11/01/01	Calibration Reference:	GJO-2002-286-TAR
		Logging Procedure:	MAC-HGLP 1.6.5, Rev. 0

Spectral Gamma Logging System (SGLS) Log Run Information:

Log Run	1	2	3		
Date	03/26/02	03/27/02	03/27/02		
Logging Engineer	Spatz	Spatz	Spatz		
Start Depth (ft)	152.0	57.0	2.0		
Finish Depth (ft)	56.0	2.0	18.0		
Count Time (sec)	100	100	100		
Live/Real	R	R	R		
Shield (Y/N)	N/A	N/A	N/A		
MSA Interval (ft)	0.5	0.5	0.5		
ft/min	N/A	N/A	N/A		
Pre-Verification	B0112CAB	B0113CAB	B0113CAB		
Start File	B0112000	B0113000	B0113111		
Finish File	B0112192	B0113110	B0113143		
Post-Verification	B0112CAA	B0114CAA	B0114CAA		
Depth Return Error (ft)	0	0	0		

Log Run	1	2	3		
Comments	See below.	No fine-gain adjustment.	Repeat section. No fine-gain adjustment.		

Logging Operation Notes:

Zero reference is the top of casing. Logging was performed with a centralizer installed on the sonde. Pre- and post-survey verification measurements employed the Amersham KUT verifier with serial number 082.

Fine-gain adjustments were made during logging to maintain the 1460-keV (^{40}K) photopeak at a pre-described channel. Fine-gain adjustments made during logging run 1 (03/26/02) were lost due to a hard drive crash on the laptop computer that occurred 03/27/02.

Analysis Notes:

Analyst:	Sobczyk	Date:	04/24/02	Reference:	Manual in revision
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SGLS pre-run and post-run verification spectra were collected at the beginning and end of each day. The verification spectra were all within the control limits. The recorded peak counts per second (cps) at the 609-keV, 1461-keV, and 2615-keV photopeaks on the post-run verification spectra as compared to the pre-run verification spectra for each day were within 10 percent of one another at each spectrum's energy line. The recorded peak counts per second for these three photopeaks were consistently lower each day in the post-run verification as compared to the pre-run verification. The post-run verification spectra were used to determine the energy and resolution calibration for processing the data using APTEC Supervisor.

Spectra for the SGLS were processed in batch mode using APTEC Supervisor to identify individual energy peaks and determine count rates. Concentrations were calculated in EXCEL (source file: G2BNov1.xls), using parameters determined from analysis of recent calibration data. Zero reference is the top of the casing. The casing configuration was assumed to be one string of 8-in. casing with a thickness of 0.322 in. to a log depth of 152 ft. A casing thickness of 0.322 in. is the published value for ASTM schedule-40 steel pipe (a commonly used casing material at Hanford). This casing thickness is within the range of measurement error associated with the logging engineer's measurements. A water correction was not needed or applied to the SGLS data. Dead time corrections were not needed because dead time did not exceed 10.5 percent.

Log Plot Notes:

Separate log plots are provided for gross gamma and dead time, naturally occurring radionuclides (^{40}K , ^{238}U , and ^{232}Th), and man-made radionuclides. For each radionuclide, the energy value of the spectral peak used for quantification is indicated. Unless otherwise noted, all radionuclides are plotted in picocuries per gram (pCi/g). The open circles indicate the minimum detectable level (MDL) for each radionuclide. Error bars on each plot represent error associated with counting statistics only and do not include errors associated with the inverse efficiency function, dead time correction, or casing correction. These errors are discussed in the calibration report. A combination plot is also included to facilitate correlation. The plots of the repeat logs demonstrate good repeatability of the SGLS data for both the man-made and naturally occurring radionuclides.

Results and Interpretations:

^{137}Cs , ^{235}U , and ^{238}U (based on the 1001-keV photopeak) were the man-made radionuclides detected in this borehole. ^{137}Cs was detected near the ground surface (4.0- through 5.0-ft log depth) at concentrations ranging from 0.6 to 1.4 pCi/g. ^{137}Cs was also detected at 130 ft with an activity of about 0.2 pCi/g. At 36 ft, ^{235}U was detected with an activity of 1.3 pCi/g near its MDL of about 1.1 pCi/g, and ^{238}U was detected

with an activity of 19.3 pCi/g. In addition, man-made ^{238}U was detected at 15.0 ft at an activity of 13.7 pCi/g near its MDL of about 13 pCi/g on the original log run and not on the repeat log run.

Recognizable changes in the KUT logs occurred in this borehole. Changes of about 5 pCi/g in apparent ^{40}K activities occur at about 22 ft. This increase in ^{40}K activities probably represents the transition from the coarse-grained sediments of the Hanford H1 to the finer grained sediments of the Hanford H2.

Gross gamma profiles from Additon et al. (1978) (attached) and Fecht et al. (1977) indicate that the sediments surrounding this borehole have contained at most only minor amounts of gamma-emitting contamination. The profile from 05/24/63 may have indicated gamma activity above background at 16.5 ft (5 m) and 52.5 ft (16 m); this gamma activity is not shown on the 05/4/76 profile. The interval at 16.5 ft (5 m) coincides with the depth where man-made ^{238}U is detected on the SGLS log.

References:

Additon, M.K., K.R. Fecht, T.L. Jones, and G.V. Last, 1978. *Scintillation Probe Profiles From 200 East Area Crib Monitoring Wells*, RHO-LD-28, Rockwell Hanford Operations, Richland, Washington.

Chamness, M.A., and J.K. Merz, 1993. *Hanford Wells*, PNNL-8800, UC-903, Pacific Northwest Laboratory, Richland, Washington.

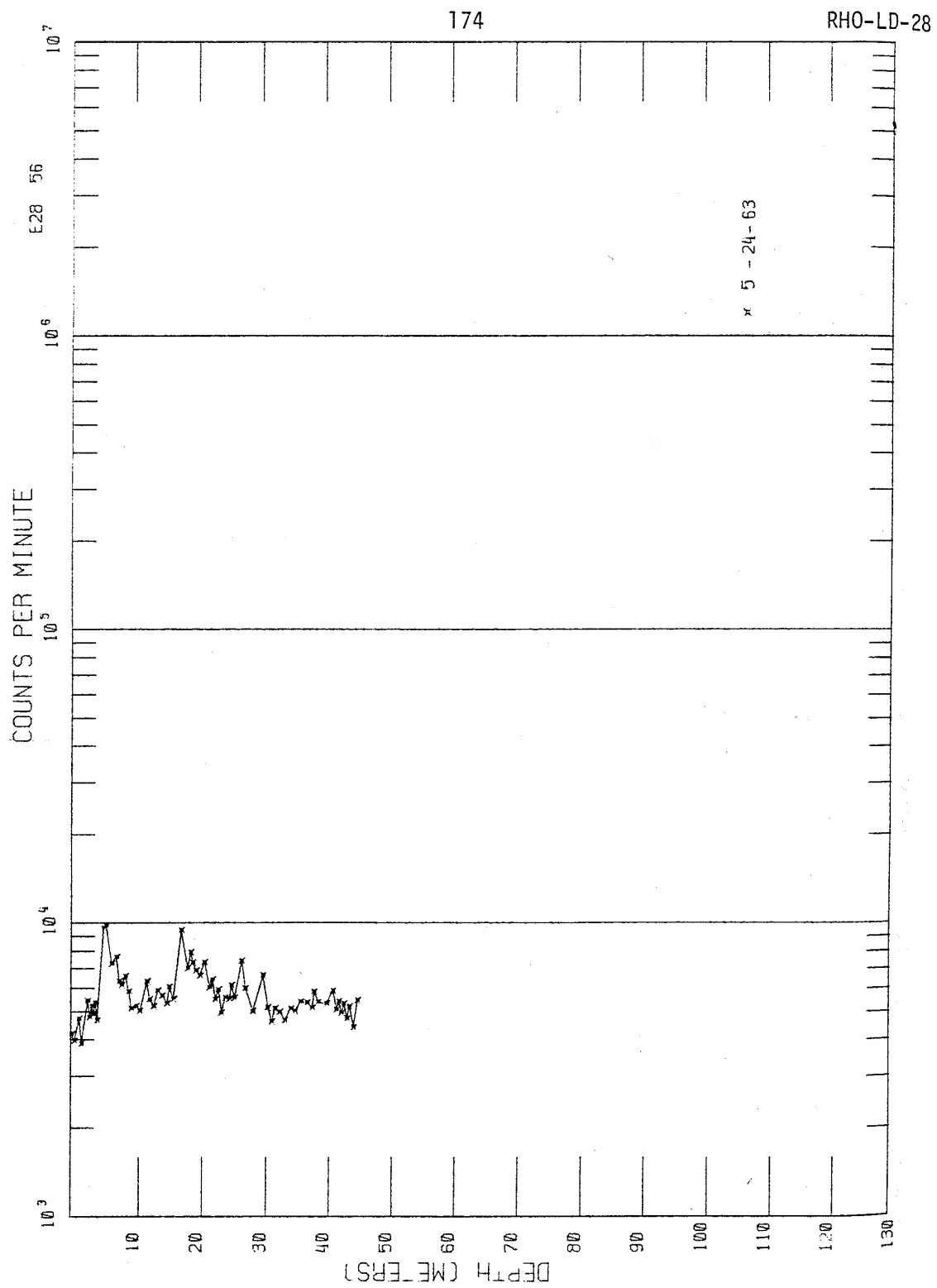
Fecht, K.R., G.V. Last, and K.R. Price, 1977. *Evaluation of Scintillation Probe Profiles From 200 Area Crib Monitoring Wells*, ARH-ST-156, UC-70, Atlantic Richfield Hanford Company, Richland, Washington.

¹ GWL – groundwater level

² N/A – not applicable

³ TOC – top of casing

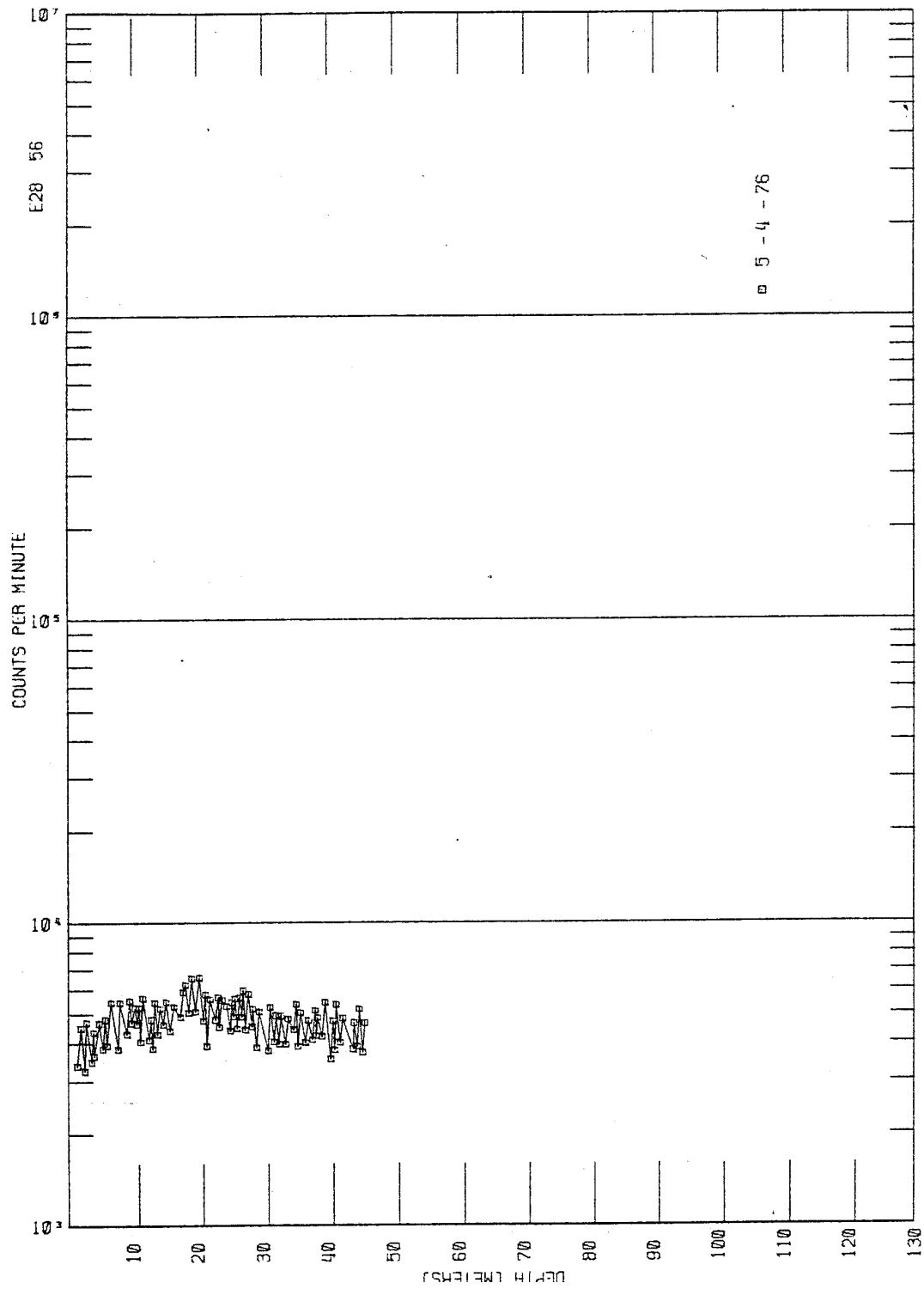
⁴ HWIS – Hanford Well Information System



from Additon et al. (1978)

175

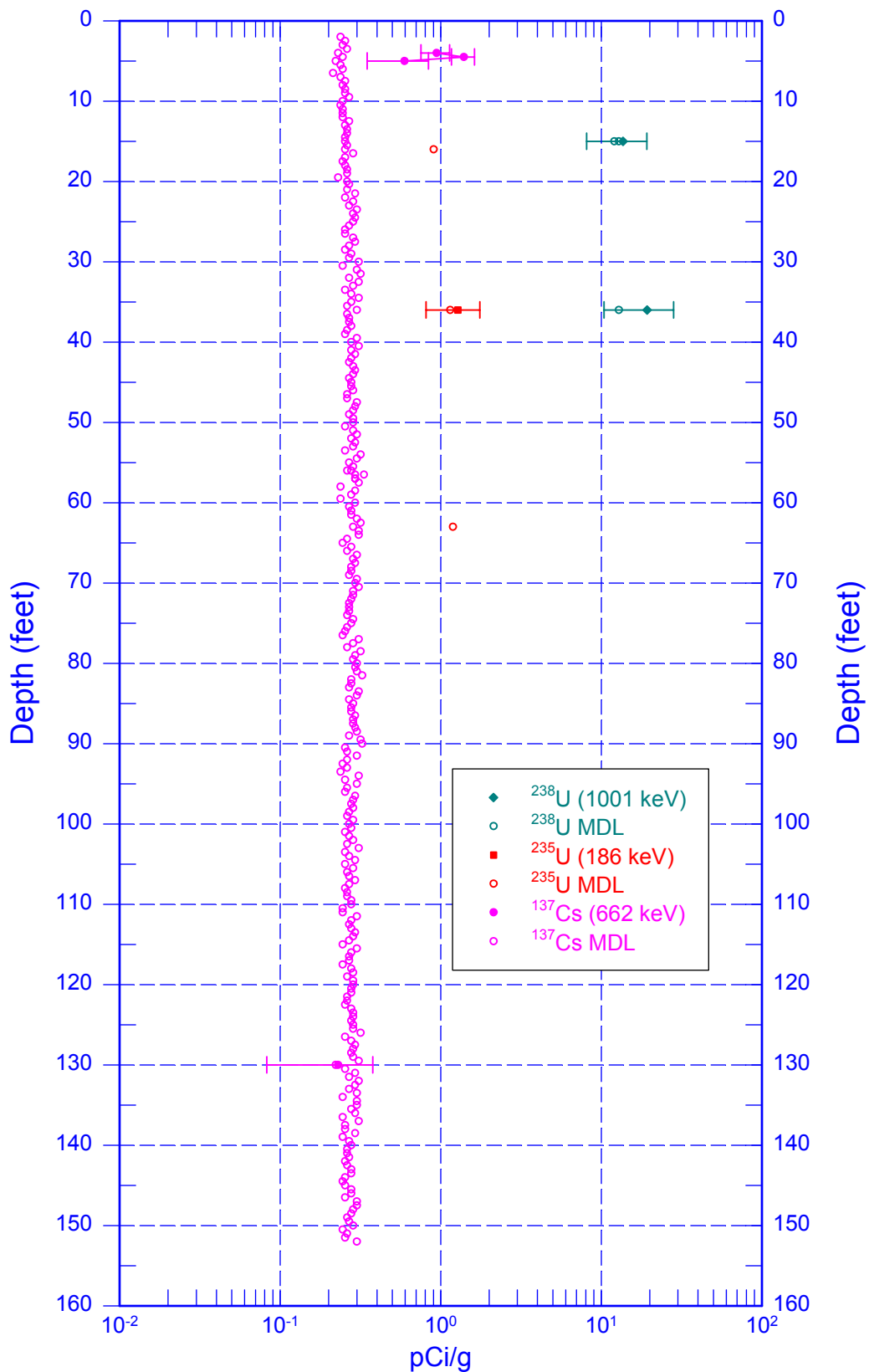
RHO-LD-28



from Additon et al. (1978)

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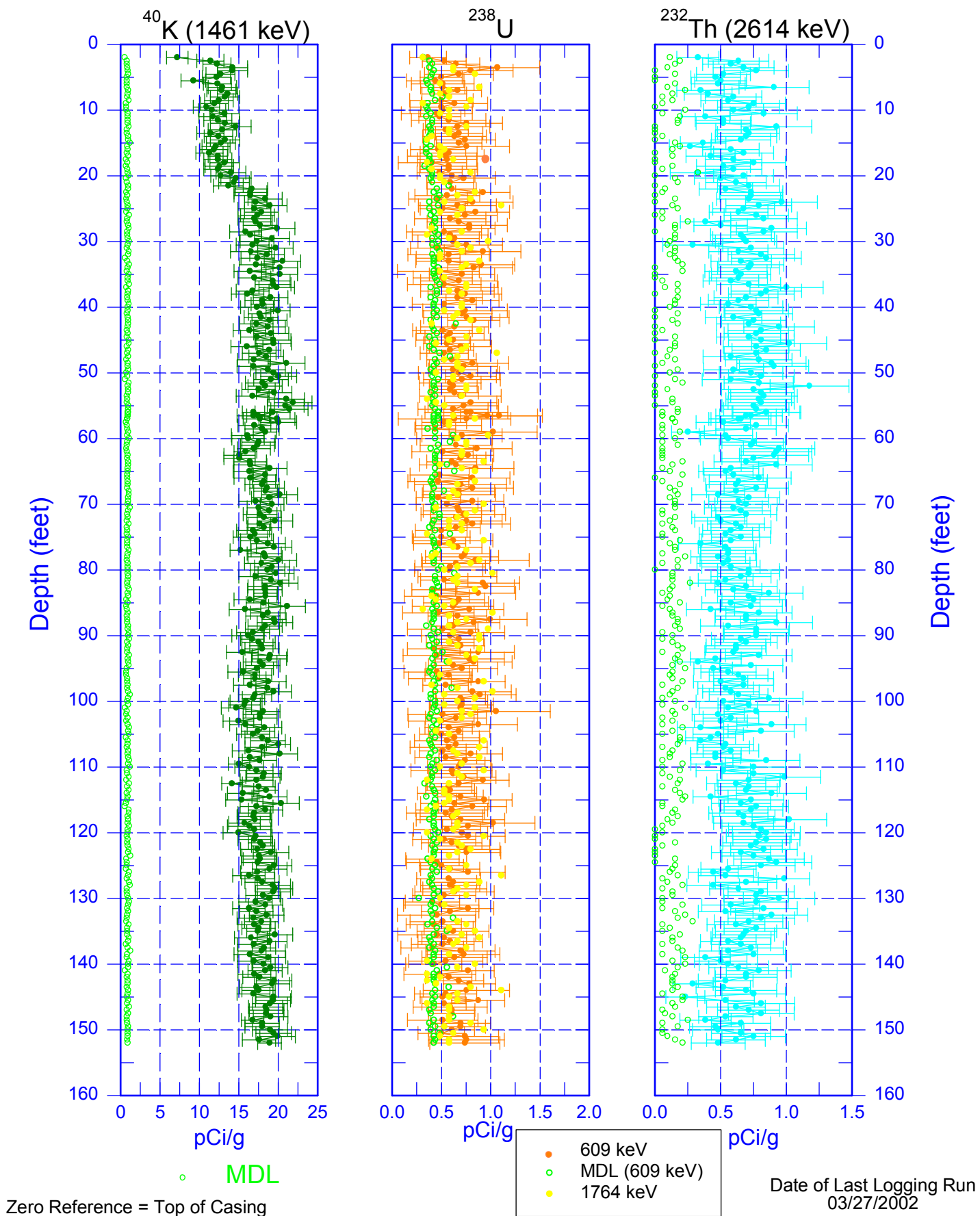
Man-Made Radionuclides



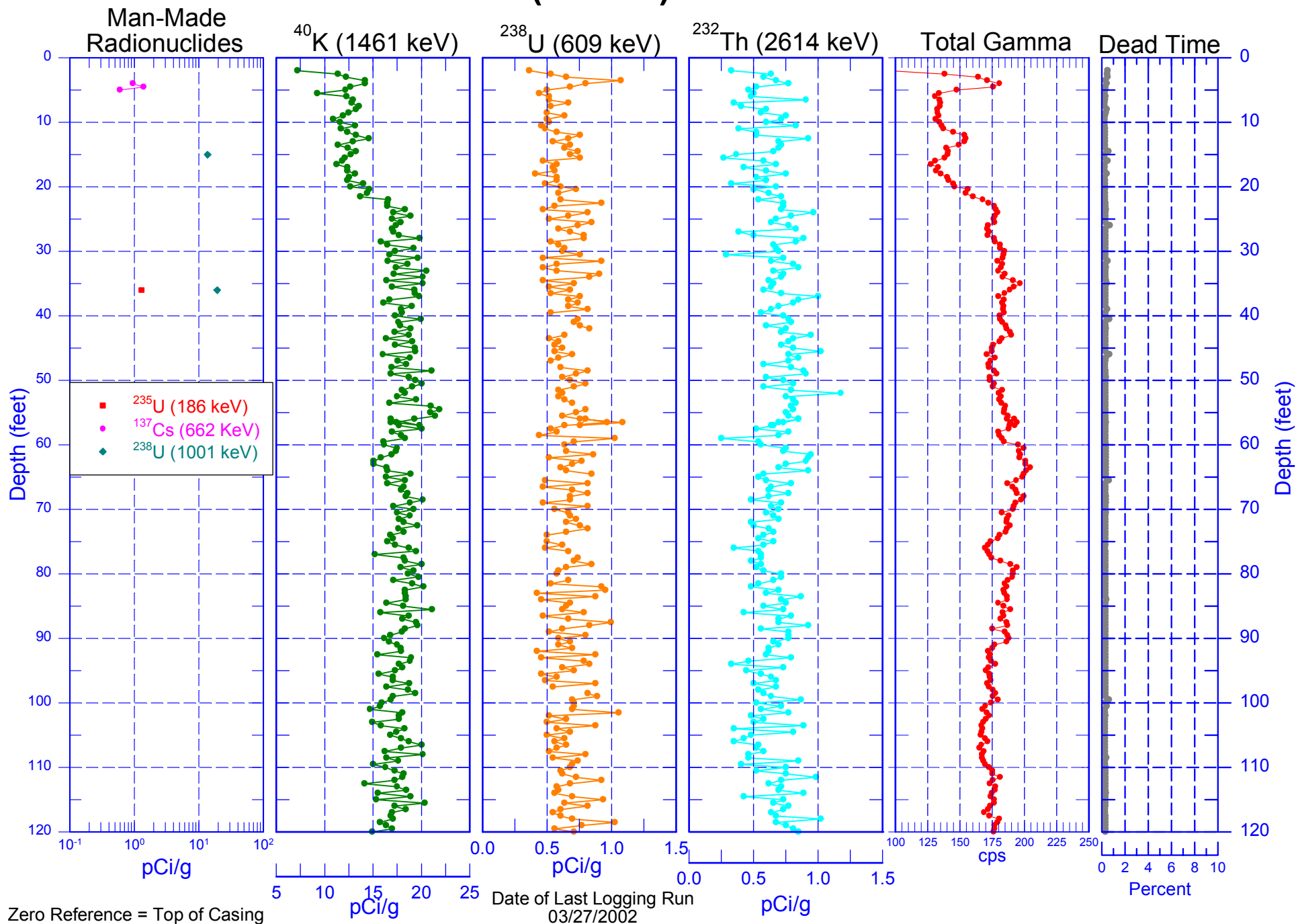
Zero Reference = Top of Casing

Date of Last Logging Run
03/27/2002

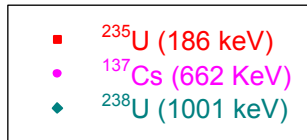
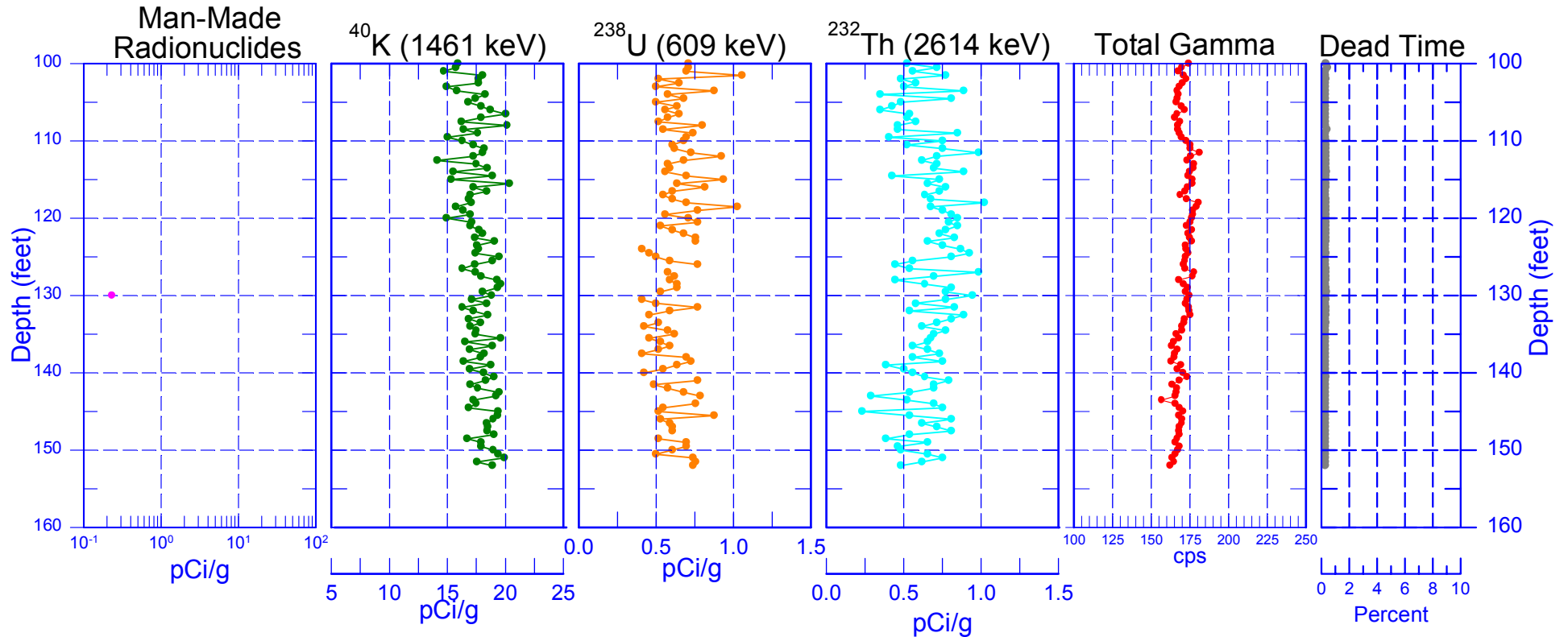
299-E28-56 (A6807) Natural Gamma Logs



299-E28-56 (A6807) Combination Plot



299-E28-56 (A6807) Combination Plot

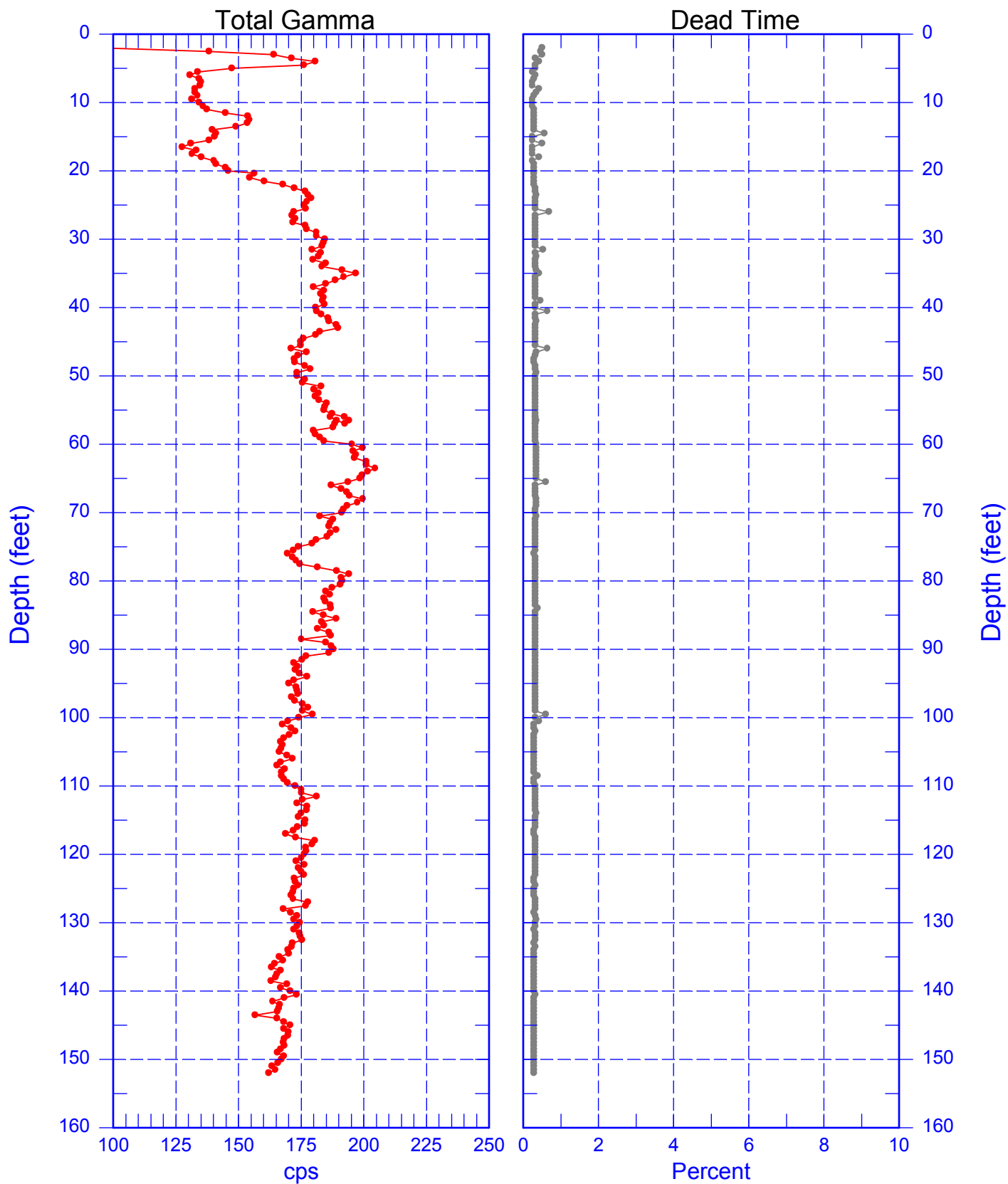


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Total Gamma & Dead Time

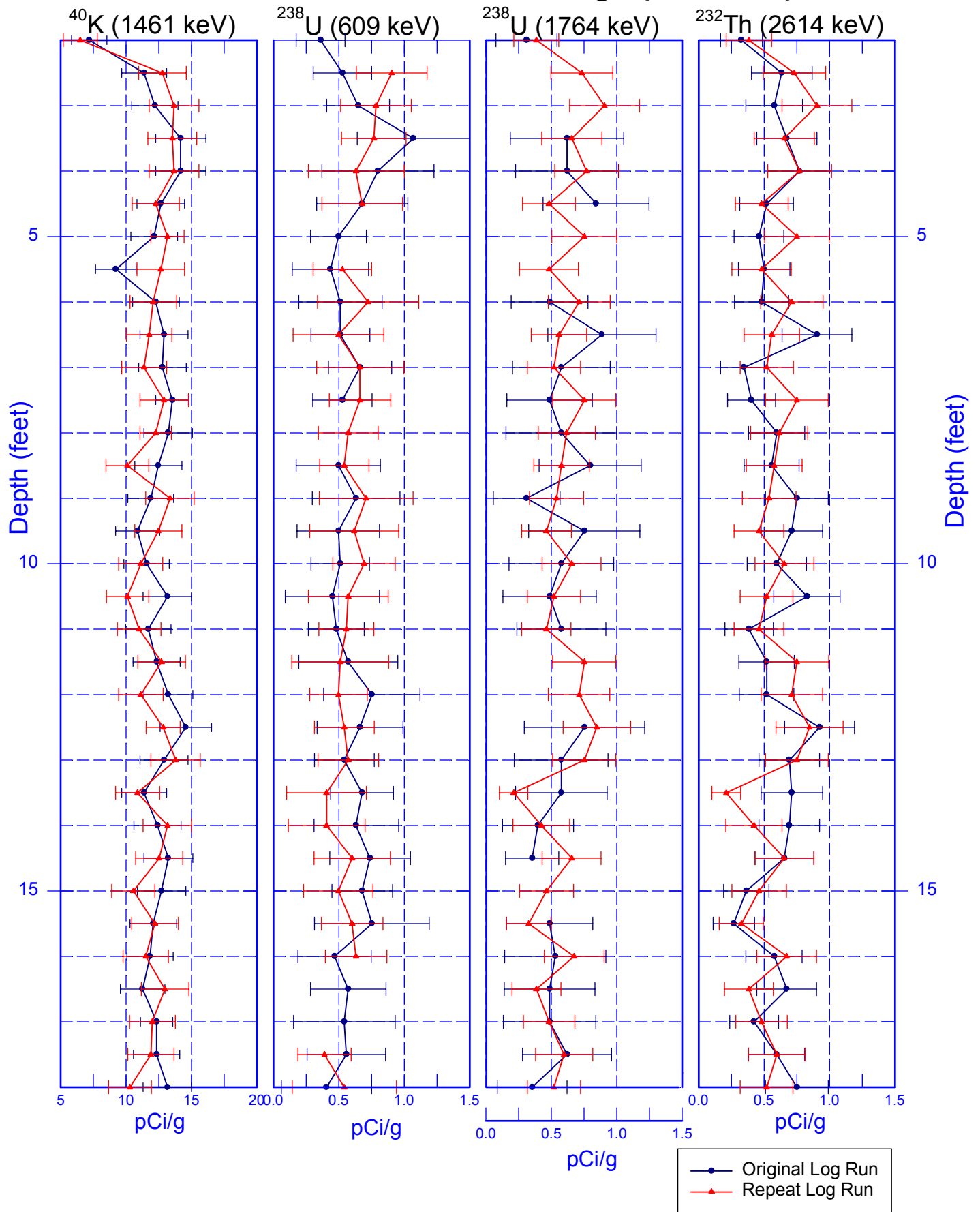


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03/27/2002

Zero Reference = Top of Casing

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Rerun of Natural Gamma Logs (2 to 18 ft)



299-E28-56 (A6807)

Rerun of Man-Made Radionuclides (2-18 ft)

